

# PATENT ABSTRACTS OF JAPAN

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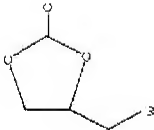
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## (54) HAIR DYE COMPOSITION

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a hair dye composition which is rich in the variation of color tones, has excellent hair-dyeing property, scarcely dyes skins, and is highly safe for hairs and skins.

**SOLUTION:** This hair dye composition characterized by containing (A) an acidic dye, (B) a 1,3-dioxolan-2-one derivative represented by the general formula (1) [R is (OR<sub>2</sub>)<sub>n</sub>OR<sub>1</sub> or (OR<sub>2</sub>)<sub>n</sub>OCOR<sub>1</sub>; R<sub>1</sub> is hydrogen atom or a 1 to 22C saturated or unsaturated linear, branched or cyclic hydrocarbon; R<sub>2</sub> is a 2 to 4C alkylene; (n) is an integer of 0 to 30], and (C) a water-soluble polymer.



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3. In the drawings, any words are not translated.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is excellent in the dye affinity to hair, and it is hard to dye it the skin, and, moreover, it relates to a hair dye composition with high safety to hair or the skin.

[0002]

[Description of the Prior Art] Conventionally, the oxidation hair dye currently used widely has the danger of causing hair damage and a temporary skin stimulus depending on how to treat in order to make hydrogen peroxide act under alkaline conditions at the time of use. For this reason, the hair dye using acid dye with little influence has been developed to the scalp or the hair.

[0003] However, since benzyl alcohol has been used for the hair dye which uses the acid dye marketed now, for example as a penetration enhancer, there was a problem the incorrect stain to the skin etc., and in respect of allergic.

[0004] On the other hand, when the penetrating agent so that an incorrect stain may be made hard to carry out to the skin etc. was used, there was a problem of becoming difficult to dye it hair. It excelled in the dye affinity and the art which the incorrect stain of HE, such as the skin, can be made hard to carry out was also searched for.

[0005] In this invention, it was made in view of the above-mentioned situation.

Therefore, it excels in the dye affinity to keratose, such as hair, and is hard to carry out an incorrect stain to the skin etc., and aims at moreover providing a hair dye composition with high safety to hair or the skin.

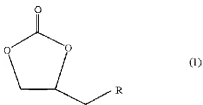
[0006]

[The means for solving a technical problem and an embodiment of the invention] It comes to note that the 1,3-dioxolane 2-one derivative which has specific structure has an osmosis promotion operation as a result of examining many things, in order that this invention persons may attain the above-mentioned purpose. As a result of inquiring wholeheartedly, by using the above-mentioned 1,3-dioxolane 2-one derivative as a penetration enhancer used together with acid dye, and combining a high molecular compound further, the knowledge of the hair dye composition which attains said purpose being obtained is carried out, and it came to make this invention.

[0007] That is, a hair dye composition, wherein this invention contains (A) acid dye, the 1,3-dioxolane 2-one derivative expressed with the (B) following general formula (1), and the (C) water soluble polymer compound is provided.

[0008]

[Formula 2]



(However, among the above-mentioned formula, R is expressed with  $-(OR^2)_nOR^1$  or  $-(OR^2)_nOCOR^1$ , and) The straight chain shape of the saturation of a hydrogen atom or the carbon numbers 1-22 or an unsaturation, a branched-chain or annular hydrocarbon group, and  $R^2$  are the alkylene groups of the carbon numbers 2-4, and n of  $R^1$  is an integer of 0-30.

[0009]Hereafter, if it explains in full detail about this invention, the hair dye composition of this invention contains (A) acid dye, the 1,3-dioxolane 2-one derivative expressed with the (B) above-mentioned general formula (1), and the (C) water soluble polymer compound.

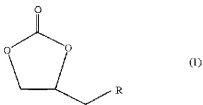
[0010]Here as acid dye which is the (A) ingredient of the hair dye composition of this invention, For example, they are mentioned by nitro dye, azo dye, nitroso dye, a triphenylmethane color, xanthene dye, quinoline dye, anthraquinone dye, indigo dye, etc., and more specifically, For example, the red No. 2, the red No. 3, the red No. 102, the red No. 104, red No. 105, The red No. 106, the yellow No. 4, the yellow No. 5, the green No. 3, the blue No. 1, the blue No. 2, The red No. 201, the red No. 227, the red No. 220, the red No. 230, the red No. 231, The red No. 232, the orange No. 205, the orange No. 207, the yellow No. 202, The yellow No. 203, the green No. 201, the green No. 204, the green No. 205, the blue No. 202, The blue No. 203, the blue No. 205 and the color No. 201, the red No. 401, the red No. 502, The red No. 503, the red No. 504, the red No. 506, the orange No. 402, The yellow No. 402, the yellow No. 403, the yellow No. 406, the yellow No. 407, the green No. 401, the green No. 402, the purple No. 401, the black No. 401, etc. are used, and these can be used, combining suitably an one-sort independent or two sorts or more.

[0011]although loadings in particular of the above-mentioned acid dye in a hair dye composition of this invention are not restricted, they are usually 0.01 to 1% more preferably 0.0001 to 10% (mass % and the following -- the same) to the whole constituent. If it may be it hard to obtain sufficient dye affinity that the above-mentioned loadings are less than 0.0001% and exceeds 10% on the other hand, there is a possibility that solubility may get worse and improvement in a dye affinity accompanying an increase in color content may not be found, either.

[0012]A 1,3-dioxolane 2-one derivative which is the (B) ingredient of a hair dye composition of this invention has the operation which improves perviousness to hair of the above-mentioned acid dye, and what is expressed with a following general formula (1) is used.

[0013]

[Formula 3]



[0014]However, R is expressed with  $-(OR^2)_n$ ,  $OR^1$  or  $-(OR^2)_nOCOR^1$  among the above-mentioned formula. The straight chain shape of a hydrogen atom or the carbon numbers 1-22 especially the saturation of 1-5, or an unsaturation, a branched-chain or annular hydrocarbon group, and  $R^2$  are the alkylene groups of the carbon numbers 2-4, and n of  $R^1$  is an integer of 0-30, especially 0-20 in the number of average addition mols of an alkylene oxide group.

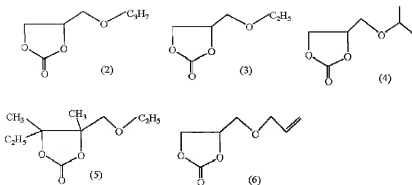
[0015]Here as an example of the above-mentioned  $R^1$ , For example, an isopropyl group, an allyl group, a methyl group, an ethyl group, a propyl group, A butyl group, a pentyl group, a hexyl group, a heptyl group, an octyl group, a nonyl group, A decyl group, an undecyl group, dodecyl, the Millis Chill group, a pentadecyl group, A palmityl group, a stearyl group, a behenyl group, an isobutyl group, t-butyl group, 1-methyl heptyl group, a 2-ethylhexyl group, a hexenyl group, a heptenyl group, An octynyl group, a nonenyl group, a decenyl group, an undecenyl group, a dodecenyl group, The Millis thenyl group, a penta decenyl group, the Palmi thenyl group, an oleyl group, A RINORU group, a RINORENIRU group, an arachidyl group, 2-ethylhexenyl group, a phenyl group, 4-methylphenyl group, benzyl, p-methoxybenzyl group, etc. can be mentioned, and an isopropyl group, an allyl group, an ethyl group, a propyl group, etc. are preferred also especially in these.

[0016]In this invention, the above-mentioned 1,3-dioxolane 2-one derivative can be used, combining suitably an one-sort independent or two sorts or more.

[0017]4-propoxymethyl-1,3-dioxolane 2-one specifically shown with the following structural formula (2) as the above-mentioned 1,3-dioxolane 2-one derivative (glycerin carbonate propyl ether), 4-ethoxymethyl 1,3-dioxolane 2-one shown with the following structural formula (3) (glycerin carbonate ethyl ether), 4-isopropoxy methyl-1,3-dioxolane 2-one shown with the following structural formula (4) (glycerin carbonate isopropyl ether), 4-ethoxymethyl 4-methyl-5-methyl-5-ethyl-1,3-dioxolane 2-one shown with the following structural formula (5) (alkyl glycerin carbonate ethyl ether), 4-pro PENOKISHI methyl-1,3-dioxolane 2-one (glycerin carbonate allyl ether) etc. which are shown with the following structural formula (6) can be mentioned.

[0018]

[Formula 4]



[0019] Although the loadings in particular of the above-mentioned 1,3-dioxolane 2-one derivative in the hair dye composition of this invention are not restricted, they are usually 1 to 10% more preferably 0.1 to 30% to the whole constituent. If it may be it hard to obtain sufficient dye affinity that the above-mentioned loadings are less than 0.1% and exceeds 30% on the other hand, improvement in the effect accompanying the increase in content may not be found that the solubility over water gets worse and it is hard to acquire the uniform liquid phase, either.

[0020] As a water soluble polymer compound which is the (C) ingredient of this invention, For example, hydroxyethyl cellulose, methyl cellulose, carboxymethyl cellulose, Cellulose type water soluble polymer compounds, such as hydroxypropylcellulose, Xanthan gum, guar gum, pullulan, pectin, a tamarind seed, Natural system water soluble polymer compounds, such as gum system water soluble polymer compounds, such as tragacanth gum and gum arabic, and sodium alginate, Sodium polyacrylate, a carboxyvinyl polymer, polyvinyl alcohol, Anionic, a nonionic water soluble polymer compound, etc. of constructional system water soluble polymer compounds, such as a polyvinyl pyrrolidone, etc. are mentioned, and a cellulose type water soluble polymer compound, especially a gum system water soluble polymer compound, etc. are preferred also in these. The above-mentioned water soluble polymer compound can be used combining suitably an one-sort independent or two sorts or more.

[0021] Although loadings in particular of the above-mentioned water soluble polymer compound in a hair dye composition of this invention are not restricted, they are usually 0.1 to 10% more preferably 0.05 to 20% to the whole constituent. It may be it hard to give sufficient ductility for hair that the above-mentioned loadings are less than 0.05%, and on the other hand, if it exceeds 20%, there may be a possibility that tactile feeling of hair may worsen.

[0022] Pharmaceutical preparation pH is preferred and, as for a hair dye composition of this invention, it is desirable 2-6, and to be more preferably adjusted to 2-4. It may become the cause of hurting hair or one's scalp if pH is smaller than two, and on the other hand, when pH is larger than six, there is a tendency for hair dyeing nature to fall.

[0023] If adjustment of the above-mentioned pH is performed, for example using inorganic acid, such as organic acid, such as glycolic acid, lactic acid, tartaric acid, acetic acid, citrate, malic acid, and succinic acid, and phosphoric acid, and chloride, etc., it is suitable and these can be used, combining suitably an one-sort independent or two sorts or more.

[0024] The remainders other than the above-mentioned acid in which a hair dye composition of this invention is used for adjustment of pH the above (A), (B), the (C)

ingredient, and if needed, and also an optional component mentioned later are water, and loadings of this water are 10 to 97% preferably to the whole constituent.

[0025] usual dose combination of lower alcohol, an antiseptic, a chelating agent, perfume, etc. which are usually used for hair dye other than the above-mentioned ingredient in the range which does not spoil an effect of this invention, the stability of a system, the above-mentioned pH value, etc. can be carried out in the range which does not bar an effect of this invention at a hair dye composition of this invention.

[0026] As for especially a hair dye composition of this invention, although the pharmaceutical form is not restricted, it is preferred to usually be provided by pharmaceutical forms, such as cream, an emulsion, gel, a solution, and form.

[0027] A hair dye composition in particular of this invention is not that to which a manufacturing method is restricted. If it can manufacture with a conventional method of the pharmaceutical form, for example, is considered as a pharmaceutical form of cream, an emulsion, gel, or a solution, the above-mentioned essential ingredient and if needed with the above-mentioned acid for pH adjustments. Usually, a wetting agent (emulsifier), a solubilizing agent, a stabilizing agent, a feel improver, a hairdressing base, perfume, etc. which are used in a cosmetic field can be added, and it can manufacture in accordance with a conventional method.

[0028] As a wetting agent (emulsifier) used here, For example, alkyl benzene sulfonate, fatty alcohol sulfate, Alkyl sulfonate, acylation amino acid, fatty acid alkanolamide, Anionic [ of an addition product of ethylene oxide and fatty alcohol etc. ], both sexes, a nonionic surfactant, etc. are mentioned, and as a feel improver and a hairdressing base, For example, oily components, such as a silicone derivative, higher alcohol, and various nonionic surface active agents, a cationic surface active agent, etc. are mentioned.

[0029] If a hair dye composition of this invention is prepared for example, in the shape of form, the above-mentioned essential ingredient and if needed with the above-mentioned acid for pH adjustments. For example, an aerosol can etc. can be filled up with what added the usual surface-active agent (Nonion system) so that it might become 0.5 to 1% about whole 1% or less and a thickener with liquefaction injection gas, such as propane, and it can be prepared so that it may be injected in the shape of form at the time of use.

[0030] In order to be able to use a hair dye composition of this invention in order to dye a desired color various keratose, such as hair, eyebrows, an eyelash, and hair, and to carry out hair dyeing of keratose, such as hair, in this way, What is necessary is just to apply to keratose for hair dyeing in accordance with a conventional method using a usual dose of various pharmaceutical forms, For example, after applying a hair dye composition of this invention to keratose to be dyed at 15-50 °C and setting reaction time around 5 to 30 minutes, the above-mentioned keratose can be washed and the above-mentioned keratose can be dyed a desired color by drying.

[0031]

[Example] Although an example and a comparative example are given and this invention is explained still in detail hereafter, this invention is not limited to the following example.

[0032] [Examples 1 and 2 and comparative examples 1-5] The presentation shown in Table 1 was followed, each ingredient was uniformly mixed and dissolved with the conventional method, and the hair manicure <DAKUBU loun> (hair dye composition) of Examples 1 and 2 and the comparative examples 1-5 was prepared. About each hair dye composition, hair dyeing nature and skin dyeing affinity were evaluated by the following

valuation method. A result is written together to Table 1.

[0033]<Appraisal method> hair dyeing nature (deltaEh)

After applying uniformly 1 g and hair manicure <DAKUBU loun> 1g prepared to a 10-cm goat hair-bundle and allowing to stand for 15 minutes at a room temperature, shampoo and rinse were performed for the above-mentioned hair-bundle by the usual method. Then, the color difference (deltaEh) of each dyeing hair-bundle was measured, and the average value of n= 3 was calculated.

[0034]Skin dyeing affinity (deltaEs)

Prepared hair manicure <DAKUBU loun> 0.2 ml was applied to 1 cm of forearm inner portion <sup>2</sup> of panelist trinominal, and it allowed to stand at the room temperature for 15 minutes. Then, warm water washed the above-mentioned application part using soap. Subsequently, the color difference (deltaEs) of the contaminated region after washing was measured, and the average value of panelist trinominal was calculated. Measurement of said color difference (deltaE) was performed using Nippon Denshoku Co., Ltd. make Spectro Color Meter SE2000.

[0035]

[Table 1]

	実例		比較例			
	1	2	1	2	3	4
グリッドカラー-1 (4-グレイッシュカラー-1, 3-グレイッシュカラー-2-3)	8			8		
グリッドカラー-2 (4-グレイッシュカラー-1, 3-グレイッシュカラー-2-3)		8				
パンジーカラー					8	
パンジーカラー						8
だいだい色 205 号	0.3	0.3	0.3	0.3	0.3	0.3
赤色 106 号	0.1	0.1	0.1	0.1	0.1	0.1
コラー	20	20	20	20	20	20
グリッド	適量			適量		適量
乳液		適量	適量		適量	
ヒト・パンジーカラー	1				1	
パンジーカラー		1	1			1
精製水	残部	残部	残部	残部	残部	残部
合計 (質量%)	100	100	100	100	100	100
pH	3	3	3	3	3	3
評価	ΔE <sub>h</sub> (%)	32	33	11	28	36
結果	ΔE <sub>s</sub> (%)	15	17	9	17	33

[0036]Since the above-mentioned comparative example 2 did not have the viscosity of \*\* (the water), spreading to hair hardly carried out it, and it was cheap per skin.

[0037]Next, according to the following presentation, it mixed until the whole dissolved each ingredient uniformly with the conventional method, and the hair dye composition of Examples 3-5 was prepared. As a result of evaluating hair dyeing nature and the dyeing affinity to skin like the above-mentioned Example 1 about these, the same good hair dyeing nature as the above-mentioned Examples 1 and 2 and the dyeing affinity to skin were shown.

[0038]

[Example 3]

\*\* Part Loadings (mass %)

Black No. 401 0.4 purple No. 401 0.1 red No. 227 0.1 yellow No. 403 0.1 glycerin carbonate ethyl ether 10.0 (4-ethoxymethyl 1,3-dioxolane 2-one)  
Malic acid Optimum dose ethanol 20.0 hydroxyethyl cellulose 1.2 perfume 0.2 purified water \*\*\*\*\* Total 100pH3.5[0039]

[Example 4]

(Undiluted solution)

\*\* Part Loadings (mass %)

Orange No. 205 0.4 yellow No. 203 0.1 glycerin carbonate propyl ester 8.0 (4-propoxymethyl-1,3-dioxolane 2-one)

Ethanol 20.0 citrate Optimum dose urea 1.0 xanthan gum 0.3 perfume 0.2 purified water

\*\*\*\*\* Total 100pH 3.3 liquefied petroleum gas / the above-mentioned undiluted solution = a PET bottle is filled up with 93/7.[0040]

[Example 5]

\*\* Part Loadings (mass %)

Orange No. 205 0.2 black No. 401 0.3 glycerin carbonate isopropyl ether 8.0 (4-isopropoxy methyl-1,3-dioxolane 2-one)

Guar gum 1.0 glycolic acid Optimum dose ethanol 20.0 perfume 0.15 hydrolysis collagen 0.5 purified water \*\*\*\*\* Total 100pH3.5[0041]

[Effect of the Invention]The variation of a color tone is abundant, the hair dye composition of this invention is excellent in the dye affinity to keratose, such as hair, and it is hard to dye it to skin, and, moreover, its safety is high to hair or the skin.

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[Translation done.]